

## ABSTRACT OF THE DISCLOSURE

The present invention is directed to a semiconductor processing  
5 apparatus and a method for clamping a semiconductor substrate and controlling  
a heat transfer associated therewith. According to one aspect of the present  
invention, a multi-polar electrostatic chuck and associated method is disclosed  
which provides a controlled and uniform heat transfer coefficient across a surface  
thereof. The multi-polar electrostatic chuck comprises a semiconductor platform  
10 having a plurality of protrusions that define gaps therebetween, wherein a  
distance or depth of the gaps is uniform and associated with a mean free path of  
the cooling gas therein. The electrostatic chuck is permits a control of a backside  
pressure of a cooling gas within the plurality of gaps to thus control a heat  
transfer coefficient of the cooling gas. The plurality of protrusions further provide  
15 a uniform contact surface, wherein a contact conductivity between the plurality of  
protrusions and the substrate is controllable and significantly uniform across the  
substrate.